

Before the
Federal Communications Commission
Washington, D.C. 20554

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In the Matter of)	
)	
Allocation and Designation of Spectrum for)	
Fixed-Satellite Services in the 37.5-38.5 GHz,)	IB Docket No. <u>97-95</u>
40.5-41.5 GHz and 48.2-50.2 GHz Frequency)	
Bands; Allocation of Spectrum to Upgrade Fixed)	RM-8811
and Mobile Allocations in the)	
40.5-42.5 GHz Frequency Band; Allocation of)	
Spectrum in the 46.9-47.0 GHz Frequency Band)	
for Wireless Services; and Allocation of Spectrum)	
in the 37.0-38.0 GHz and)	
40.0-40.5 GHz for Government Operations)	
)	

FURTHER NOTICE OF PROPOSED RULE MAKING

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By the Commission:

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I. INTRODUCTION

1. In this Further Notice of Proposed Rulemaking (Further Notice), we propose to modify the band plan for the 36.0-51.4 GHz band.¹ Our proposed band plan reflects decisions reached at the 2000 World Radiocommunication Conference (WRC-2000) in Istanbul, Turkey.² To provide satellite and terrestrial operators with greater certainty about the scope of operations in this band, we also propose specific power flux-density (PFD) limits on satellite operations in portions of this band consistent with the results of WRC-2000.³ We solicit comment on these proposed changes.⁴

¹ See *Allocation and Designation of Spectrum for Fixed-Satellite Services in the 37.5-38.5 GHz, 40.5-41.5 GHz, and 48.2-50.2 GHz Frequency Bands; Allocation of Spectrum to Upgrade Fixed and Mobile Allocations in the 40.5-42.5 GHz Frequency Band; Allocation of Spectrum in the 46.9-47.0 GHz Frequency Band for Wireless Services; and Allocation of Spectrum in the 37.0-38.0 GHz and 40.0-40.5 GHz for Government Operations*, Report and Order, 13 FCC Rcd 24649 (1998) (36-51 GHz Order).

² The International Telecommunication Union (ITU) holds multi-national World Radiocommunication Conferences (WRCs) at two or three year intervals to establish international provisions governing the use of the electromagnetic spectrum.

³ PFD is a standard measure of the transmitted signal strength at the receiving antenna. PFD is usually measured over one square meter and within a 4 kHz or 1 MHz bandwidth.

⁴ We will consider service and licensing rules for these bands in future proceedings.

II. BACKGROUND

2. In 1994, the Commission initiated a rulemaking proceeding to open 18 gigahertz of spectrum between 40.5 GHz and 153 GHz for commercial use.⁵ In the *Millimeter Wave* proceeding, the Commission proposed to allocate the 40.5-42.5 GHz and the 47.2-48.2 GHz bands for new millimeter wave technology.⁶ Later, in 1995, the Commission adopted a Notice of Proposed Rulemaking and Order proposing to provide additional spectrum between 37.0-38.6 GHz for terrestrial point-to-point operations.⁷ In the *39 GHz* proceeding, the Commission proposed to modify existing rules governing fixed point-to-point operations in the 38.6-40.0 GHz band to permit competitive wireless operations.⁸

3. After the Commission adopted Notices in the *Millimeter Wave* and *39 GHz* proceedings, several applicants filed for new systems in the 36.0-51.4 GHz band.⁹ In addition, on March 4, 1996, Motorola Satellite Communications, Inc. (Motorola) filed a Petition for Rulemaking seeking allocation of the 37.5-38.6 GHz band to the fixed-satellite service (FSS) (space-to-Earth) on a co-primary basis.¹⁰ We placed Motorola's petition on public notice and received comment on the proposal.¹¹

4. In late 1996, the Commission established an informal working group comprised of all interested Bureaus and Offices, which considered the records of relevant proceedings, met informally with interested industry participants and, eventually, developed as many band-plan options as possible that might accommodate potential future uses of the band. After gathering information about the band and possible band plan options, the Commission initiated a comprehensive proceeding in 1997 that attempted to settle the competing satellite, terrestrial and government proposals for use of this band; the ongoing *Millimeter Wave* and *39 GHz* rulemaking proceedings; and the difficulties inherent in sharing between ubiquitous wireless and satellite services.¹² Accordingly, the Notice of Proposed Rulemaking proposed to

⁵ See *In the Matter of Amendment of Parts 2, 15, and 21 of the Commission's Rules to Permit Use of Radio Frequencies Above 40 GHz for New Radio Applications*, Notice of Proposed Rulemaking, 9 FCC Rcd 7078 (1994) (*Millimeter Wave Notice*).

⁶ See *id.* at 7083.

⁷ See *In the Matter of Amendment of the Commission's Rules Regarding the 37.0-38.6 GHz and 38.6-40.0 GHz Band – Implementation of Section 309(j) of the Communications Act*, Notice of Proposed Rulemaking and Order, 11 FCC Rcd 4930 (1995) (*39 GHz Notice*).

⁸ See *39 GHz Notice*, 11 FCC Rcd at 4931.

⁹ See, e.g., Application of Sky Station International, Inc. for Authority to Construct, Deploy and Operate a Global Stratospheric Telecommunications System, File No. 96-SAT-P/LA-96 (filed, March 20, 1996); Further Comments of Sky Station International, Inc., ET Docket 94-124, RM-8784 (filed, Dec. 24, 1996), available at http://haifoss.fcc.gov/prod/ecfs/retrieve.cgi?native_or_pdf=pdf&id_document=1750060001; see also Motorola Satellite Systems, Inc.'s Application to Construct, Launch and Operate the M-Star System, File No. 157-SAT-P/LA-96(72) (filed, Sept. 4, 1996).

¹⁰ See Motorola Satellite Communications, Inc., Petition for Rulemaking, Docket No. 97-95, RM-8811 (filed, March 4, 1996).

¹¹ *36-51 GHz Order*, 13 FCC Rcd at 24654.

¹² See *In the Matter of Allocation and Designation of Spectrum for Fixed-Satellite Services in the 37.5-38.5 GHz, 40.5-41.5 GHz, and 48.2-50.2 GHz Frequency Bands; Allocation of Spectrum to Upgrade Fixed and Mobile Allocations in the 40.5-42.5 GHz Frequency Band, Allocation of Spectrum in the 46.9-47.0 GHz Frequency Band* (continued....)

establish an overall framework for operations in the 36.0-51.4 GHz band.¹³

5. In the *36-51 GHz Order*, we established a band plan for non-Government operations in the 36.0-51.4 GHz frequency band to increase certainty in business planning, and to clarify the relationship among various Commission allocation proceedings.¹⁴ Due to the difficulty of sharing between ubiquitous wireless systems and satellite systems, the *36-51 GHz Order* adopted a band plan for non-Government wireless services and for non-Government FSS.¹⁵ The plan recognized that forced sharing between services intended for communications with ubiquitous consumer terminals would likely result in undue technical constraints on one or both of the services. Because the spectrum in the 36.0- 51.4 GHz was essentially unused, except for already licensed wireless services in the 38.6-40.0 GHz portion of the band, we devised a band plan to create an overall framework that would allow ubiquitous wireless and ubiquitous satellite services to develop independent of sharing burdens.¹⁶

6. The *36-51 GHz Order* provided separate designations¹⁷ within the 36.0-51.4 GHz band for non-Government terrestrial wireless services and for non-Government satellite services.¹⁸ The *36-51 GHz Order* provided a total of four gigahertz of spectrum for FSS on a primary basis in the 37.6-38.6 GHz (1000 megahertz) and 40.0-41.0 GHz (1000 megahertz) bands for downlinks, and the 48.2-50.2 GHz (2000 megahertz) bands for uplinks.¹⁹ The *36-51 GHz Order* also provided a total of 5.6 gigahertz of spectrum for wireless services on a primary basis in separate bands.²⁰ The *36-51 GHz Order* retained the existing wireless service designations in the 38.6-40.0 GHz (1400 megahertz) and 47.2-48.2 GHz (1000 megahertz) bands and added designations for wireless services in the 37.0-37.6 GHz (600 megahertz), 41.0-42.5 GHz (1500 megahertz), 46.9-47.0 GHz (100 megahertz), and 50.4-51.4 GHz (1000 megahertz)

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for Wireless Services; and Allocation of Spectrum in the 37.0-38.0 GHz and 40.0-40.5 GHz for Government Operations, Notice of Proposed Rule Making, 12 FCC Rcd 10130 (1997).

¹³ *Id.* at 10131; *see also 36-51 GHz Order*, 13 FCC Rcd at 24650-52.

¹⁴ *See 36-51 GHz Order*, 13 FCC Rcd at 24659-24660.

¹⁵ *Id.* For purposes of this item, the term “wireless services” refers only to the (terrestrial) Fixed and (terrestrial) Mobile services and excludes all satellite services. *See 36-51 GHz Order*, 13 FCC Rcd at 24651 n.4.

¹⁶ *36-51 GHz Order*, 13 FCC Rcd at 24660. The other satellite services included the broadcasting-satellite service (BSS) and mobile-satellite service (MSS).

¹⁷ We distinguish between spectrum “allocations” and “designations.” A spectrum allocation assigns radio frequency spectrum to one of the various pre-defined radio services listed in Section 2.1 of the Commission’s rules. 47 C.F.R. § 2.105(b) & n.7. Designations are “generally only needed where bands are allocated to more than one service and sharing between these services may be difficult.” *36-51 GHz Order*, 13 FCC Rcd at 24650, n.3. Significantly, spectrum designations for a particular service do not necessarily preclude other allocated services from operating in a given band, provided that the allocated service can meet the technical constraints that the spectrum designation imposes in further proceedings where service and licensing rules are developed. Unlike allocations, no “primary” or “secondary” designations exist; instead, we either designate spectrum for a service or we do not.

¹⁸ *36-51 GHz Order*, 13 FCC Rcd at 24660.

¹⁹ *Id.* at 24667.

²⁰ *Id.* at 24668.

bands.²¹ Finally, the *36-51 GHz Order* also re-allocated the 42.5-43.5 GHz band for exclusive Government use and the 47.2-48.2 GHz band for exclusive non-Government use.²²

7. In 1999, we adopted the *36-51 GHz Reconsideration Order* that affirmed our earlier determinations on the amount of spectrum to designate for satellite and wireless services and denied several petitions for reconsideration.²³ In the *36-51 GHz Reconsideration Order*, we also recognized that several wireless and satellite operators were developing input for U.S. proposals to WRC-2000 that proposed a global arrangement for sharing portions of the 36.0-51.4 GHz band by the Fixed Service (FS) and FSS.²⁴ We indicated that we would consider revising the band plan depending on the outcome of WRC-2000.²⁵

8. After we adopted the *36-51 GHz Reconsideration Order*, the U.S. delegation to WRC-2000 reached consensus on a proposal for a global sharing arrangement for portions of the 36.0-51.4 GHz band. After years of debate over numerous band plans and sharing models, competing satellite and wireless proponents recognized the onerous burdens that a sharing regime might impose on both satellite and wireless services; agreed that wireless and, especially, satellite systems operate most efficiently in a globally consistent allocation of contiguous spectrum; and acknowledged that wireless operations around the globe already occupied many portions of frequency spectrum below 40.0 GHz while relatively few wireless services occupied spectrum above 40 GHz. These fundamental principles allowed satellite and wireless proponents in the United States to agree to a global band plan for satellite and terrestrial services in the 37.5-42.5 GHz band during the domestic preparation for WRC-2000. Seizing on this domestic consensus, the United States forwarded the global band plan as a U.S. submission to the Inter-American Telecommunication Commission (CITEL).²⁶ The United States then worked to achieve the regional consensus necessary to incorporate the U.S. proposals for this band in CITEL's submissions to WRC-2000.²⁷

9. At the CITEL meeting, the United States delegation asserted that the bands in which licensed FS systems operated in the United States required stringent satellite PFDs and that FSS could instead conduct

²¹ *Id.*

²² *Id.* at 24671.

²³ See *Allocation and Designation of Spectrum for Fixed-Satellite Services in the 37.5-38.5 GHz, 40.5-41.5 GHz, and 48.2-50.2 GHz Frequency Bands; Allocation of Spectrum to Upgrade Fixed and Mobile Allocations in the RM-8811 40.5-42.5 GHz Frequency Band; Allocation of Spectrum in the 46.9-47.0 GHz Frequency Band for Wireless Services; and Allocation of Spectrum in the 37.0-38.0 GHz and 40.0-40.5 GHz Frequency Bands for Government Operations*, Order on Reconsideration, 15 FCC Rcd 1766 (1999) (*36-51 GHz Reconsideration Order*).

²⁴ See *36-51 GHz Reconsideration Order*, 13 FCC Rcd at 1767 n. 4.

²⁵ See *id.*

²⁶ See Delegation of the United States of America, *Proposal to Modify Art. S5, Table S21-4 of Art. S21 and the Suppression of Res. 129 and 133*, PCC.III/doc 1604/00 (Mar del Plata, Argentina, March 6-10, 2000). CITEL, the *Comisión Interamericana de Telecomunicaciones*, is the telecommunications arm of the Organization of American States and is comprised of 35 member countries from North, Central and South America.

²⁷ See CITEL Administrations, *Proposals for the Work of the Conference*, Doc. 14-E, Addendum 1 at 15 (March 27, 2000) (CITEL Proposals).

the majority of its operations in a new global FSS allocation at 40.0-42.0 GHz. Moreover, the U.S. delegation maintained that, with careful site selection and engineering, the type of FSS gateways that FSS proponents had described could still be operated in the bands below 40 GHz, even with the stringent PFD limits. To arrive at a joint CITELE proposal, however, Region 2 administrations, including the United States, made a series of compromises that resulted in new PFD limits that proved somewhat more favorable to satellite gateway operations below 40 GHz than those limits that the United States had originally proposed. Although the United States compromised slightly on its preferred PFD limits below 40 GHz, it did so to achieve a regionally supported WRC proposal.

10. In their final form, the CITELE submissions to WRC-2000 proposed a system of “soft-segmentation” that would permit both the FS and the FSS to be allocated on a co-primary basis throughout the 37.5-42.5 GHz portion of the band.²⁸ The CITELE proposals relied on different satellite PFD limits above and below 40 GHz to encourage relatively unconstrained technological innovation and growth of terrestrial and satellite services in different portions of the band.²⁹ Under the CITELE proposals, satellite space stations were required to follow more restrictive PFD limits below 40 GHz and in the 42.0-42.5 GHz band to encourage wireless use within these bands and were permitted to use more liberal PFD limits in the 40.0-42.0 GHz band to encourage satellite use.³⁰

11. In June, 2000, WRC-2000 adopted provisions creating a comprehensive sharing arrangement for fixed and satellite services in the 37.5-42.5 GHz band, based in large part on the soft-segmentation approach that CITELE and the U.S. proposed. WRC-2000 adopted several changes to the international Radio Regulations that can now be considered domestically. First, WRC-2000 identified the 37.0-40.0 GHz and the 40.5-43.5 GHz bands as available for high-density fixed service (HDFS) operations.³¹ Second, WRC-2000 adopted an FSS allocation in the 40.5-42.5 GHz band for Region 1 creating a global FSS allocation in this band.³² Third, WRC-2000 established PFD limits in the 40.0-40.5 GHz band for FSS and provisional PFD limits in the 37.5-40.0 GHz and 40.5-42.5 GHz bands for FSS, MSS, and BSS.³³ Fourth, the WRC adopted a secondary MSS allocation in Region 2 in the 40.5-41.0 GHz band.

²⁸ *Id.* at 15-21. The ITU divides the world into three regions. Generally, Region 1 covers Europe, Russia, and Africa; Region 2 covers the Americas; and Region 3 covers Asia. 47 C.F.R. § 2.104(b); *see also* ITU Radio Regulations S5.2. Prior to WRC-2000, FS and FSS were allocated co-primary in the 37.5-40.5 GHz and 42.5-43.5 GHz bands. In the 40.5-42.5 GHz band FS and FSS were provisionally allocated on a co-primary basis in Regions 2 and 3, and in several countries within Region 1.

²⁹ *See CITELE Proposals*, Doc. 14-E, Addendum 1 at 20-22.

³⁰ *Id.*

³¹ Prior to WRC-2000, footnote S5.547 identified the 31.8 - 33.4 GHz, 51.4 - 52.6 GHz, 55.78 - 59 GHz and 64 - 66 GHz bands as available for HDFS use. WRC-2000 modified this footnote to add the 37.0 - 40.0 GHz and 40.5 - 43.5 GHz bands as available for HDFS use. We view HDFS as synonymous with the ubiquitous wireless services that we propose to designate in the 37.0-40.0 GHz and 42.0-42.5 GHz bands.

³² As a result, FS and FSS are allocated on a co-primary basis in the 37.5-43.5 GHz band. *WRC-2000 Final Acts*, Article S5. A consequence of this allocation change was the suppression by WRC-2000 of alternative allocation country footnotes S5.551C and S5.551D. We therefore propose their removal from Part 2 of our rules in Appendix B.

³³ At frequencies below 40.0 GHz, the PFD limits adopted at WRC-2000 effectively limit the range of technically feasible satellite service operations to “gateway”-type FSS operations. The PFD limits included in Table S21-4 (continued....)

We are initiating this proceeding to solicit comment on how best to domestically accommodate the changes to the international Radio Regulations adopted at WRC-2000.

III. DISCUSSION

12. In this Further Notice, we seek comment on proposed modifications to the 37.0–43.5 GHz portion of the band plan that would harmonize our domestic band plan with the international sharing arrangement established at WRC-2000 and to promote spectrum efficiency.³⁴ In general, we propose to designate the 37.0–40.0 GHz band and the 42.0–42.5 GHz band for wireless services and to designate the 40.0–42.0 GHz band for satellite services. While our proposed band plan alters the layout of satellite and terrestrial service designations in the band to recognize the U.S. achievements at WRC-2000, the proposed band plan would not change the total spectrum currently designated for use by satellite and terrestrial wireless services.

13. As explained more fully below, we propose: (1) to re-designate the 41.0–42.0 GHz band for satellite services and the 37.6–38.6 GHz band for wireless services; and (2) to add a designation to the 40.5–41.0 GHz band for MSS. We also propose to adopt or consider several changes to the table of frequency allocations, including the following: (1) adding an FSS allocation in the 37.5–37.6 GHz band; (2) shifting the MSS allocation from the 39.5–40.0 GHz band to the 40.5–41.0 GHz band;³⁵ (3) adding a primary Government FSS allocation to the 40.5–41.0 GHz band; (4) adding a primary FSS allocation in the 41.0–42.0 GHz band; (5) considering the addition of fixed and mobile for non-Government use to the 42.5–43.5 GHz band; and (6) providing additional protection to Radio Astronomy in the 42.5–43.5 GHz band. Finally, we propose to better define the spectrum designations that we choose for the 36.0–51.4 GHz band. Below, we seek comment on the general approach to the proposed domestic implementation of the U.S. achievements at WRC-2000 and on each of the proposals individually.

14. The proposed changes to the domestic allocations seek to maximize efficient use of the radio frequency spectrum by both satellite and terrestrial users with minimal changes to the existing Table of Frequency Allocations. The following chart compares the WRC-2000 allocations with the current and proposed domestic non-Government allocations and designations in the 37.0–43.5 band.³⁶ We have excluded the 36.0–37.0 GHz and 43.5–51.4 GHz portions of the band plan from the chart because we do not propose any changes in these bands.

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for the 37.5–40 GHz and 40.5–42.5 GHz bands are provisional for stations in the FSS for which the ITU receives complete coordination or notification information prior to the end of the next World Radiocommunication Conference in 2003. WRC-2003 will consider whether to adopt the provisional PFD limits permanently. See *WRC-2000 Final Acts*, Res. 84; see also *WRC-2000 Final Acts*, Article S21 nn. S21.16.11 & S21.16.FSS.

³⁴ WRC-2000 made no significant changes to the 36.0 – 37.0 GHz and 43.5 – 51.4 GHz bands; therefore, we do not propose any changes to these bands.

³⁵ As discussed in more detail below, we propose to adopt a primary MSS allocation for Government use and a secondary MSS allocation for non-Government use in the 40.5–41.0 GHz band.

³⁶ Services that appear in uppercase letters (e.g., MOBILE) are primary services. Services that appear in lowercase letters (e.g., Mobile) are secondary services. 47 C.F.R. § 2.104(d). Stations of a secondary service may not cause harmful interference to, or claim protection from, stations of a primary service. 47 C.F.R. § 2.104(d)(4).

**Current and Proposed Non-Government Allocations
and Designations in the 37.0-43.5 GHz Band³⁷**

Frequency (GHz)	37.0	37.5	38.0	39.5	40.0	40.5
WRC-2000 Allocation	MOBILE, FIXED, SPACE RESEARCH, S5.547	FIXED, FSS, ees, MOBILE, SPACE RESEARCH, S5.547, S5.551AA	FIXED, FSS, ees, MOBILE, S5.547, S5.551AA	FIXED, FSS, ees, MOBILE, MSS, S5.547, S5.551AA	FIXED, FSS, ees, MOBILE, MSS, EES, SPACE RESEARCH	
Current FCC Allocation	FIXED, MOBILE	FIXED, MOBILE, FSS (37.6-38.0 only)	FIXED, MOBILE, FSS	FIXED, MOBILE, FSS, MSS	FSS, MSS	
Proposed FCC Allocation	FIXED, MOBILE	FIXED, MOBILE, FSS	FIXED, MOBILE, FSS	FIXED, MOBILE, FSS	FSS, MSS	
Current FCC Designation	Wireless Services	Wireless Services, (37.5-37.6), FSS (37.6-38.0)	FSS (38.0-38.6) Wireless Services (38.6-39.5)	Wireless Services	FSS, MSS	
Proposed FCC Designation	Wireless Services	Wireless Services	Wireless Services	Wireless Services	FSS, MSS	
Frequency (GHz)	37.0	37.5	38.0	39.5	40.0	40.5
Frequency (GHz)	40.5	41.0	42.0	42.5	43.5	
WRC-2000 Allocation	FIXED, FSS, BSS, BROADCASTING, Mobile, mss (Region 2), S5.547	FIXED, FSS, BSS, BROADCASTING, Mobile, S5.551G, S5.547	FIXED, FSS, BSS, BROADCASTING, Mobile, S5.551G, S5.547, S5.551AA	FIXED, FSS, MOBILE, RADIO ASTRONOMY, S5.149, S5.547		
Current FCC Allocation	BSS, FSS, Fixed, BROADCASTING, Mobile	FIXED, MOBILE, BROADCASTING, BSS	FIXED, MOBILE, BROADCASTING, BSS	RADIO ASTRONOMY		
Proposed FCC Allocation	FSS, Fixed, BSS, BROADCASTING, Mobile, mss	FIXED, MOBILE, BROADCASTING, BSS, FSS	FIXED, MOBILE, BROADCASTING, BSS	RADIO ASTRONOMY		
Current FCC Designation	FSS, BSS	Wireless Services	Wireless Services	–		
Proposed FCC Designation	FSS, BSS, MSS	FSS, BSS	Wireless Services	–		
Frequency (GHz)	40.5	41.0	42.0	42.5	43.5	

A. Proposed Designation Changes

1. Redesignate Portions of Satellite and Wireless Services Spectrum

15. We propose to redesignate the spectrum available for wireless services from 41.0-42.0 GHz to 37.6-38.6 GHz and to redesignate the spectrum available for satellite uses from 37.6-38.6 GHz to 41.0-42.0 GHz. We previously designated the 41.0-42.0 GHz for wireless services and the 37.6-38.6 GHz for FSS.³⁸ WRC-2000, however, adopted a global plan for sharing between fixed services and satellite services. This global sharing arrangement imposes a more rigorous satellite PFD limit below 40.0 GHz favoring terrestrial uses and a less rigorous PFD limit from 40.0-42.0 GHz favoring satellite uses.

³⁷ For ease of reference, this chart excludes all Government allocations and Government designations. For a complete listing of non-Government and Government allocations, see 47 C.F.R. § 2.106.

³⁸ See 36-51 GHz Order, 13 FCC Rcd at 24668.

Therefore, we propose to take this WRC-2000 sharing arrangement into account in managing our domestic band plan. Although this proposal would require satellite operators to operate in slightly higher frequency bands, the sharing plan increases the total amount of exclusively designated, contiguous spectrum available to satellite operators and will better correspond to the international sharing arrangement established at WRC-2000. We seek comment on our proposal to re-designate the 37.6-38.6 GHz band for wireless services and the 41.0-42.0 GHz band for satellite services.

2. Add MSS Designation to the 40.5-41.0 GHz Band

16. WRC-2000 adopted a secondary MSS allocation at 40.5-41.0 GHz in Region 2. The 40.5-41.0 GHz band is currently designated for FSS and BSS. To allow satellite licensees the maximum flexibility possible in deciding how to use this spectrum, we propose to reflect the results of WRC-2000 in our domestic band plan by adding an MSS designation to the 40.5-41.0 GHz band.³⁹ We seek comment on our proposal to add an MSS designation in the 40.5-41.0 GHz band.

3. Modify Part 25 and Part 101 Rules to Reflect New Designations

17. We propose to amend Part 25 of our Rules concerning fixed-satellite service to remain consistent with our proposals for revised designations. The proposed amendment to our Rules, which are set forth in Appendix B, would include adding the bands that are designated for wireless services but available to FSS on a limited basis to the list of frequencies available for FSS use in Section 25.202(a)(1) of our Rules.⁴⁰ We also propose to amend Part 101 of our Rules concerning fixed microwave services to correct the erroneous omission of FSS from the list of services that we permit in the 38.6-40.0 GHz band. This correction would add a new footnote to explain that frequencies in the 38.6-40.0 GHz band are shared among mobile, fixed and FSS stations licensed in other services, subject to certain conditions.

B. Proposed Allocation Changes

18. We seek comment on a variety of allocation changes in the 37.0-43.5 GHz band. In this Further Notice, we propose only those allocation changes necessary to accommodate and enhance our proposed changes in frequency-use designations. The proposed allocation changes generally seek to implement domestic policies reasonably consistent with the outcome of WRC-2000 that promote the public interest in the efficient use of frequency spectrum.

1. Add FSS Allocation in the 37.5-37.6 GHz Band

19. We propose to add an FSS allocation in the 37.5-37.6 GHz band. In this portion of the band, the current FSS allocation begins at 37.6 GHz. Although we propose to designate the entire 37.5-40 GHz band for wireless services, we propose to permit – subject to certain conditions – some FSS use in this band. Adding an additional 100megahertz FSS allocation in the 37.5-37.6 GHz band would remain consistent with our proposed designation of the 37.5-40 GHz band for wireless services, but would provide future FSS licensees more flexibility in deploying their systems. We seek comment on the benefits of adding an additional 100 megahertz FSS allocation in the band designated for wireless services.

³⁹ See ¶¶ 22-25, *infra*, for the related spectrum allocation discussion.

⁴⁰ 47 C.F.R. § 25.202(a)(1).

20. In this proceeding, we originally proposed to allocate the 37.5-38.5 GHz band for FSS.⁴¹ The National Telecommunications and Information Administration (NTIA), however, expressed concern about an FSS allocation in this band. According to NTIA, FSS use of the 37.5-38.0 GHz band might adversely affect Government space research service operations in the 37.0-38.0 GHz band. NTIA, therefore, requested that we shift the FSS allocation from the 37.5-38.5 GHz band to the 37.6-38.6 GHz band; this shift would eliminate 100 MHz of overlap between allocations for FSS and the Government space research service.⁴² In the *36-51 GHz Order*, we accepted NTIA's contention and allocated the 37.6-38.6 GHz band for FSS.⁴³ Since we adopted the *36-51 GHz Order*, however, the anticipated satellite use of the 37.5-37.6 GHz band has changed.

21. Prior to WRC-2000, ubiquitous FSS terminals seemed to constitute the most likely satellite use of this spectrum. Currently, however, only relatively large, relatively expensive FSS terminals appear suited to comply with the PFD limits adopted at WRC-2000. As a result, FSS operators appear more likely to deploy a small number of satellite gateway earth stations in this band than to deploy ubiquitous FSS earth terminals.⁴⁴ Because deploying a small number of FSS gateways creates a much more promising sharing environment for FS operators than deploying ubiquitous FSS terminals, we propose to add an FSS allocation in the 37.5-37.6 GHz band.⁴⁵ According to the NTIA, the Government's intended uses of the band are more susceptible to interference from non-geostationary satellite networks and therefore suggest that we limit non-Government use of this spectrum to geostationary (GSO) FSS operations.⁴⁶ We seek comment on our proposal to allocate FSS in the 37.5-37.6 GHz band and on whether we should limit operations to GSO FSS systems as NTIA suggests.

2. Shift MSS Allocation from 39.5-40.0 GHz to 40.5-41.0 GHz

22. We propose to shift an MSS allocation from the 39.5-40.0 GHz band to the 40.5-41.0 GHz band. The 39.5-40.0 GHz band is currently allocated to the FS, Mobile, FSS, and MSS services on a co-primary basis; however, in our *36-51 GHz Order*, we concluded that ubiquitous satellite uses could not share the same spectrum as ubiquitous terrestrial uses. Accordingly, we designated the band for wireless services. While we propose to continue to permit FSS gateways to operate in the 39.5-40.0 GHz band, we tentatively conclude that MSS cannot share with ubiquitous terrestrial uses. Therefore, we propose to delete the MSS allocation from the non-Government column of the Table of Frequency Allocations contained in Part 2.106 of the Commission's Rules. For consistency, we would normally propose to delete the MSS allocation in this band from the Government column; however, NTIA has stated that North Atlantic Treaty Organization (NATO) treaty obligations require that we retain the Government

⁴¹ See *36-51.4 GHz Notice*, 12 FCC Rcd at 10140.

⁴² See *36-51 GHz Order*, 13 FCC Rcd at 24666.

⁴³ See *id.* at 24667.

⁴⁴ Typical satellite "gateways" are Earth stations used to connect end-user terminals to the public switched telephone network (PSTN) through a satellite. Ordinarily, user terminals transmit to the satellite, the satellite relays the transmission to the gateway Earth station, which then connects the transmission to the PSTN. Although some of our rules refer to "gateways" in the context of specific satellite systems, see, e.g., 47 C.F.R. § 25.209, we have not yet defined the term because gateway configurations often vary by system and service.

⁴⁵ See ¶¶ 45-47, *infra*, for the related gateway earth station discussion.

⁴⁶ See Letter from William T. Hatch, Office of Spectrum Management, NTIA, to Bruce Franca, Office of Engineering and Technology, FCC (March 2, 2001).

MSS allocation for possible future requirements.⁴⁷

23. NTIA has committed to observe the provisional PFD limits on MSS that WRC-2000 adopted and prohibit Government MSS earth stations from claiming protection from non-Government stations operating in the fixed and mobile services; however, NTIA has conditioned its willingness to accept restrictive pfd limits and to forgo demands for additional protection for Government MSS earth stations on Government (military) access to the 40.5-41.0 GHz band for primary FSS and MSS operations.⁴⁸ Because Government FSS and MSS operations in the 40.5-41.0 GHz band remain consistent with proposed non-Government uses of this band, we propose to embody NTIA's conditional commitments in a footnote, USYYY, in the Government column of the Table of Frequency Allocations and, on this basis, tentatively conclude that we should retain the Government MSS allocation in the 39.5-40.0 GHz band.

24. In conjunction with our proposal to delete the non-Government MSS allocation from the 39.5-40.0 GHz band, we propose to add a primary Government MSS and a secondary non-Government MSS allocation in the 40.5-41.0 GHz band. We previously allocated the 40.5-41.0 GHz band exclusively for non-Government use to BSS, FSS, Broadcasting, Fixed and Mobile services.⁴⁹ At WRC-2000, the U.S. attempted through CITEL to add MSS on a primary basis in this band to maintain the one-gigahertz MSS and FSS allocation necessary in order to accommodate a possible future Government use. The WRC-2000 proposal that CITEL adopted, however, proposed only a secondary MSS allocation in the 40.5-41.0 GHz band.⁵⁰

25. Although WRC-2000 adopted only a secondary MSS allocation in the 40.5-41.0 GHz band in Region 2,⁵¹ NTIA has requested that we amend the Government column of the Table of Frequency Allocations to add a primary MSS allocation in the 40.5-41.0 GHz band.⁵² According to NTIA, future Government MSS operations will require one contiguous gigahertz of primary MSS spectrum in the 40 GHz range that remains unencumbered by the more restrictive PFD limits that we propose for frequencies below 40 GHz.⁵³ If we were to allocate the 40.5-41.0 GHz band on a primary basis to MSS, Government operators could access primary MSS spectrum from 40.0 GHz to 41.0 GHz. We seek comment on whether to adopt a primary MSS allocation in the 40.5-41.0 GHz band for Government MSS. We also seek comment on whether to adopt a primary or secondary MSS allocation in this band for non-Government MSS operators. If commenters believe a primary MSS allocation is warranted for non-

⁴⁷ See Letter from Richard D. Parlow, Office of Spectrum Management, NTIA, to Richard Smith, Office of Engineering and Technology, FCC (April 30, 1997), *available at* http://hfafoss.fcc.gov/prod/ecfs/retrieve.cgi?native_or_pdf=pdf&id_document=1831190001.

⁴⁸ See Letter from William T. Hatch, Office of Spectrum Management, NTIA, to Bruce Franca, Office of Engineering and Technology, FCC (March 2, 2001).

⁴⁹ See 47 C.F.R. § 2.106.

⁵⁰ See *CITEL Proposals*, Doc. 14-E, Addendum 1 at 19 ("Addition of the [MSS] secondary allocation in the 40.5-41.0 GHz band . . . is necessary since it will no longer be possible to effectively implement MSS in the 39.5-40.0 GHz band given the proposed power flux-density limits in the 37.5-40.0 GHz band").

⁵¹ See *WRC-2000 Final Acts*, Art. S5.

⁵² See Letter from William T. Hatch, Office of Spectrum Management, NTIA, to Bruce Franca, Office of Engineering and Technology, FCC (March 2, 2001).

⁵³ See *id.*

Government uses, we seek comment on the consequences of adopting a primary MSS allocation when the international table for Region 2 provides for only a secondary allocation.

3. Add FSS Allocation to the 40.5-41.0 GHz Band

26. We propose to add a primary FSS allocation to the Government column of the Table of Frequency Allocations in the 40.5-41.0 GHz band. This band is currently allocated for exclusive non-Government use. Our proposal to designate the 37.0-40.0 GHz band for wireless services eliminates half of the one gigahertz of primary FSS spectrum that the Government has sought that is not encumbered by restrictive PFD limits. Adding a primary FSS allocation in this band would maintain the one-gigahertz MSS and FSS allocations for possible future Government use. Moreover, as noted above, NTIA has conditioned its willingness to accept restrictive pfd limits and to forgo demands for protection for Government MSS earth stations in the 39.5-40.0 GHz band on military access to the 40.5-41.0 GHz band for primary FSS and MSS operations.⁵⁴ We seek comment on whether to adopt an FSS allocation in this band for Government FSS operations.

4. Add FSS Allocation to the 41.0-42.0 GHz Band

27. We propose to add a primary FSS allocation to the 41.0-42.0 GHz band. WRC-2000 adopted PFD limits that favor terrestrial uses below 40.0 GHz and that favor satellite uses from 40.0-42.0 GHz.⁵⁵ In this Further Notice, we propose to redesignate the spectrum available for wireless services from 41.0-42.0 GHz to 37.6-38.6 GHz and to redesignate the spectrum available for satellite use from 37.6-38.6 GHz to 41.0-42.0 GHz. We propose to add a primary FSS allocation to the 41.0-42.0 GHz band in order to redesignate the 41.0-42.0 GHz band for FSS use as described above. We seek comment on this proposed allocation.

5. Consider Adding Fixed and Mobile Allocations for non-Government Use to the 42.5-43.5 GHz Band

28. We seek comment on whether to add primary, non-Government Fixed and Mobile allocations to the 42.5-43.5 GHz band and then designate the band for wireless services. WRC-2000 identified the 42.5-43.5 GHz band as available for HDFS.⁵⁶ In the United States, this band is currently allocated on a co-primary basis to FS, FSS (Earth-to-space), Mobile, and Radio Astronomy (RA) services. These allocations currently are for exclusive Government use, except for RA, in which we also permit non-Government uses.⁵⁷ Radio astronomy is a passive radio service in which operators seek and receive extremely low-power signals from cosmic radio sources; however, adequate geographic separation between RA and active services, such as FS, Mobile or FSS (Earth-to-space), generally permits sharing. Although each of the active services in the 42.5-43.5 GHz band (FS, Mobile, and FSS) can theoretically share with RA to some degree, we believe that non-Government FS operators may have an interest in operating in this band because WRC-2000 identified the 42.5-43.5 GHz band as available for HDFS.

29. Prior to 1998, Government and non-Government shared allocations in the 42.5-43.5 GHz band on

⁵⁴ See *id.*

⁵⁵ See *WRC-2000 Final Acts*, Art. S.21.

⁵⁶ See *WRC-2000 Final Acts*, n. S5.547.

⁵⁷ As explained above, traditional siting restrictions or "quiet zones" around RA sites generally allow Fixed and Mobile services to share with RA.

a co-primary basis. In 1998, however, we adopted the current band plan in the *36-51 GHz Order*.⁵⁸ During that proceeding, NTIA proposed a spectrum swap in which we would reallocate the 47.2-48.2 GHz band for exclusive non-Government use in exchange for reallocating the 42.5-43.5 GHz band for exclusive Government use.⁵⁹ In its proposal, NTIA asserted that an exclusive Government allocation in the 42.5-43.5 GHz band for FS, FSS, and Mobile services would not only help meet future Government needs, but also reassure commercial bidders for licenses in the 47.2-48.2 GHz band that they would not need to coordinate with Government operations. In the *36-51 GHz Order*, we agreed to NTIA's proposed spectrum swap and allocated the 42.5-43.5 GHz band for exclusive Government use in exchange for an exclusive non-Government allocation in the 47.2-48.2 GHz band.⁶⁰

30. In choosing to adopt the exclusive non-Government allocation for the 47.2-48.2 GHz band, we relied on our desire to serve the needs of High Altitude Platform Service (HAPS) operators.⁶¹ In the two years that have passed since we adopted the *36-51 GHz Order*, however, HAPS has modified its technological approach and has withdrawn its interest to develop its service in the 47.2-48.2 GHz band at this time.⁶² As a result, we are no longer convinced that non-Government operators require exclusive rights to use the 47.2-48.2 GHz band. Therefore, we seek comment on whether to return the 42.5-43.5 GHz and 47.2-48.2 GHz bands to their original allocations for both Government and non-Government use or, if non-Government operators continue to need exclusive spectrum, to swap the 47.2-48.2 GHz band for the Government's 42.5-43.5 GHz band. Under the later option, we would reallocate the 42.5-43.5 GHz band for exclusive non-Government use, except for RA, and reallocate the 47.2-48.2 GHz band for exclusive Government use. We seek comment on each of these proposals.

31. Although WRC-2000 did not identify the 47.2-48.2 GHz band for HDFS, we believe that non-Government licensees could use the 47.2-48.2 GHz band for HDFS, at least within the United States. Accordingly, while we seek comment on the extent of non-Government interest in using the 42.5-43.5 GHz band for HDFS, we also seek comment on whether we should simply maintain the current allocation scheme in the 42.5-43.5 GHz and the 47.2-48.2 GHz bands to avoid unnecessary prejudice to possible future Government operations.

6. Protect Radio Astronomy in the 42.5-43.5 GHz Band

32. Prior to WRC-2000, Resolution 128 prevented administrations from implementing FSS in the 41.5-42.5 GHz band until the Radiocommunication Bureau of the International Telecommunication Union (ITU-R) could identify and agree to technical and operational measures to protect RA operations in the 42.5-43.5 GHz band. WRC-2000 modified Resolution 128 and added footnote S5.551G to the Radio

⁵⁸ See *36-51 GHz Order*, 13 FCC Rcd at 24656-58.

⁵⁹ See Letter to Dale Hatfield, Chief, FCC Office of Engineering and Technology from William T. Hatch, Office of Spectrum Management, NTIA (Sept. 24, 1998), available at https://hfafoss.fcc.gov/prod/ecfs/retrieve.cgi?native_or_pdf=pdf&id_document=2160740001.

⁶⁰ See *36-51 GHz Order*, 13 FCC Rcd at 24670.

⁶¹ See *id.*

⁶² See *Amendment to Part 27 of the Commission's Rules to Revise Rules for Services in the 2.3 GHz Band and to Include Licensing of Services in the 47 GHz Band*, Order, WT Docket No. 98-136, __ FCC Rcd __ (2000) (terminating a rulemaking proceeding concerning licensing and service rules for the 47.2-48.2 GHz band after finding "an insufficient basis upon which to establish service rules for the spectrum").

Regulations.⁶³ Under footnote S5.551G, the aggregate PFD in the 42.5-43.5 GHz band produced by all space stations in any non-geostationary system operating in the 41.5-42.5 GHz band shall not exceed -167 dB(W/m²) in any one megahertz band at the site of an RA station for more than two percent of the time. Footnote S5.551G also restricts geostationary FSS or BSS operations in the 42.0-42.5 GHz band. The PFD limits that footnote S5.551G adopts are provisional and subject to modification by WRC-2003.

33. In order to protect RA from potential satellite interference, we propose to adopt a modified version of S5.551G. This footnote, which would appear as USXXX in the Table of Frequency Allocations, would apply only to the 41.5-42.0 GHz band for FSS because we do not propose to allocate the 42.0-42.5 GHz band for FSS in the United States. We request comment on this proposal.

34. Based on previously demonstrated problems in adjacent-band sharing between FSS and RA services in the 42.5-43.5 GHz band, NTIA has requested that we consider deleting BSS from the 42.0-42.5 GHz band entirely. The PFD limits for BSS that WRC-2000 adopted and that appear in USXXX remain provisional and – due to anticipated out-of-band emissions – may not fully protect RA operations in the 42.5-43.5 GHz band. Deleting the BSS allocation would preclude any BSS operations in the 42.0-42.5 GHz band and provide greater protection to RA in the 42.5-43.5 GHz band. We seek comment on whether the provisional PFD limits adopted at WRC-2000 for BSS would fully protect RA, and if not, whether we should delete the current BSS allocation from the 42.0-42.5 GHz band.

C. Proposed PFD Limits

35. In the *36-51 GHz Order*, we adopted separate designations for satellite and wireless services because sharing the same spectrum between these services proved difficult.⁶⁴ We explained that these spectrum designations would not necessarily preclude other allocated services from operating in a given band, but would require the non-designated service to meet the constraints adopted in future proceedings. Placing limits on satellite PFD in a reference bandwidth produced at the surface of the Earth is one standard method to protect terrestrial services from unacceptable satellite emissions. In this Further Notice, we propose to adopt band-specific PFD limits as a means of implementing the designations described above. The proposed PFD limits clarify the meaning of the spectrum designations that we propose for the 37.5-42.0 GHz band.⁶⁵

1. Default Rule for PFD Limits

36. As a preliminary matter, our proposals for satellite PFD limits depart from the precise formulation of the power-control mechanisms that WRC-2000 adopted. In Article S21 of the Final Acts,

⁶³ A consequence of modifying Resolution 128 and adding footnote S5.551G was the suppression by WRC-2000 of related footnotes S5.551B and S5.551E. We therefore propose their removal from Part 2 of our rules in Appendix B.

⁶⁴ See *36-51 GHz Order*, 13 FCC Rcd at 24666-68.

⁶⁵ To determine the appropriate satellite PFD levels for protecting FS, the type of FS application must be examined. For example, in the United States and in some other parts of the world, the primary FS application below 40 GHz is ubiquitous terrestrial broadband services. These FS operators intend to compete with wireline and fiber-optic services. To compete successfully against these services, FS providers must assure their customers very high availability and quality. To ensure high availability and quality, FS operations require more protection from potential interference than some other services with lower availability and quality requirements. If FS providers cannot provide adequate availability and quality, FS will fail to compete effectively with wireline and fiber-optic services.

WRC-2000 established relatively high PFD limits for fade conditions and relied on licensees to *decrease* their PFD to account for normal operating conditions.⁶⁶ Both the United States' proposal to CITELE, and the CITELE proposal to WRC-2000, however, established lower PFD limits for normal operating conditions and permitted power *increases* to accommodate fade conditions.⁶⁷

37. We have never needed to address how to permit satellite space station licensees to respond to fade conditions in our rules. In the lower-range frequency bands, fade conditions do not attenuate signals nearly as much as in the higher frequency ranges; therefore, a single PFD limit generally has permitted operations in both normal-operating conditions and fade conditions. In the higher-range frequency bands, such as the 37.5-40.0 GHz band, however, fade conditions can cause serious signal degradation; therefore, satellite operators need some mechanism of adjusting PFD limits in response to fade conditions to maintain continuous service to the public. In response, we propose to follow the U.S./CITELE approach, which establishes lower PFD limits for normal operating conditions and, where applicable, allows licensees to *increase* power to compensate for fade conditions.⁶⁸

38. Adopting either the proposed U.S./CITELE power-control method or the WRC-2000 method should yield the same result; however, we have never fully considered the technical and practical implications of adopting the power control methods developed at WRC-2000. While all of the PFD limits that we propose below follow the U.S./CITELE power-control methods that adopt lower PFD limits for normal conditions and allow increases for fade conditions, we seek comment on whether it would be advisable or more beneficial to follow the approach adopted by WRC-2000 in Article S21 of the Final Acts. We seek comment on what, if any, technical or practical complications might arise if we were to establish higher PFD limits for fade conditions and required satellite operators to decrease power for normal operating conditions.

2. FSS PFD Limits

39. In the 37.5-42.5 GHz band, both the FS and FSS share a co-primary worldwide allocation; therefore, some sharing criteria are needed. In the *36-51 GHz Order*, however, we chose not to adopt PFD limits in the 37.5-43.5 GHz band because the internationally adopted PFD limits applied only to a portion of the FS/FSS band and only until a future WRC modified the limits.⁶⁹ Instead, the Commission relied on band designations, but sought to develop international PFD limits for the entire 37.5-42.5 GHz

⁶⁶ The normal operating condition for satellite space stations occurs during clear skies. Under "normal operating" conditions, atmospheric gases, such as oxygen and water vapor, attenuate signals somewhat, although the exact amount varies depending on the precise mix of atmospheric gases present at any given location and the signal's radio frequency. The least desirable propagation condition for signals occurs during precipitation. Under "fade conditions," precipitation increases attenuation of signals measurably more than under normal operating conditions, although the exact amount varies depending on the extent of the precipitation and the signal's radio frequency.

⁶⁷ Rather than present the PFD limits for normal operating conditions in Table S21.4, the ITU Radio Regulations reference those values in a footnote and in Resolution 84. And rather than present the PFD limits for fade conditions in a footnote, the ITU Radio Regulations reference those values in the main table. Our proposed approach incorporates the WRC-2000 results in a different format.

⁶⁸ Cf. 47 C.F.R. § 25.204(e) (allowing satellite *Earth station* licensees to increase equivalent isotropically radiated power during fade conditions).

⁶⁹ The PFD limits applied only to the 37.0-40.5 GHz portion of the band. See S21.16, Table S21-4 of the Radio Regulations, Edition of 1998, Geneva 1998.

band at WRC-2000 as part of a harmonized worldwide sharing scheme. Based on the U.S./CITEL proposals, WRC-2000 incorporated provisional PFD limits for the 37.5-42.5 GHz band into Article S21 of the Radio Regulations.⁷⁰

40. The PFD limits that WRC-2000 adopted tend to favor wireless services over satellite services in the 37.0-40.0 GHz and 42.0-43.5 GHz bands, but tend to favor satellite services over terrestrial services in the 40.0-42.0 GHz band.⁷¹ Consistent with our proposed band designations in the 37.5-42.5 GHz band, we conclude that adopting the PFD limits of WRC-2000 would enhance and promote commercial development of both satellite and wireless services in this band. While the ITU has further studies underway regarding issues related to these PFD limits at WRC-2003, U.S. terrestrial wireless licensees, which operate systems today and plan to deploy additional systems in the near future, would benefit from the certainty of knowing the precise PFD limits that will apply in the United States. Similarly, satellite operators, whose systems require more time to build than terrestrial operators, would benefit from knowing the parameters that they will need to observe in the United States when constructing their global systems. Moreover, as explained above, proponents of wireless services and satellite services debated the merits of various PFD limits for several years and finally arrived at a consensus agreement prior to WRC-2000.⁷² Accordingly, we are strongly inclined to conclude that the benefits of adopting PFD limits for this band now substantially outweigh any potential advantage in awaiting the final results of WRC-2003. Because both satellite and wireless operators would benefit from an added level of certainty concerning the potential impact by the other service on their operations, commenters who propose that we delay in bringing these benefits to the public should explain with particularity how additional delay would promote the public interest.

3. Additional NGSO FSS Constraints

41. To provide additional protection to Fixed and Mobile services when clear skies limit atmospheric attenuation for FSS operations, WRC-2000 imposed additional restrictions on non-geostationary satellite orbit (NGSO) FSS systems that operate in the 37.5-40.0 GHz band.⁷³ Under Footnote S5.551AA, NGSO FSS systems “should” employ power control or other incremental methods of fade compensation on the order of 10 decibels (dB) to reduce potential interference to terrestrial services.⁷⁴ Subsequent studies conducted in the United States indicate that NGSO FSS systems should observe a 12 dB satellite PFD

⁷⁰ The PFD limits that WRC-2000 adopted for the Space Research Service in the 37.0-38.0 GHz band and FSS in the 40.0-40.5 GHz band are not provisional. The other PFD limits that WRC-2000 adopted in this band, however, are provisional values and remain subject to Resolution 84. Resolution 84 invites the ITU-R to conduct several studies prior to WRC-2003 concerning the 37.5-43.5 GHz band. These studies would include an analysis of whether the provisional satellite PFD limits adequately protect FS. We note that in determining what satellite PFD levels are appropriate for protecting the FS, the type of FS application must be examined. For example, in the United States and in some other parts of the world, the primary FS application 37.5-43.5 GHz range is ubiquitous terrestrial broadband applications.

⁷¹ PFD limits apply only to satellite operations; however, to the extent that liberal PFD limits permit powerful satellite emissions that some terrestrial systems cannot overcome, liberal satellite PFD limits can create barriers to the widespread deployment of those terrestrial operations.

⁷² See *supra* nn. 5-29 and accompanying text.

⁷³ See *WRC-2000 Final Acts* n. S5.551AA.

⁷⁴ *Id.*

reduction in order to protect the FS.⁷⁵ We propose to strengthen the level of protection provided for terrestrial services domestically by incorporating a modified version of this footnote into the PFD limits we propose in Section 25.208 of our rules. Specifically, we propose to lower the Article S21 PFD limits for NGSO FSS by 12 dB but provide for operation up to the Article S21 values under fade conditions. We request comment on this proposal.

4. Additional GSO FSS Constraints

42. WRC-2000 imposed similar additional restrictions on GSO FSS systems that operate in Region 2 in the 37.5-40.0 GHz band. Specifically, WRC-2000 adopted Resolution 84 that requires a Region 2 administration to seek the agreement of a neighboring administration if a proposed GSO FSS system would produce a PFD that exceeds the Article S21 limits minus 12 dB over a neighboring administration's territory. To protect Fixed and Mobile services in the United States and abroad, we propose to incorporate this additional GSO FSS constraint into the PFD limits of section 25.208 of our rules. Therefore, we propose to lower the PFD limits for GSO FSS to 12 dB below the Article S21 value, but propose to provide for operation up to the Article S21 values under fade conditions. We seek comment on this proposal.

5. Time Limits on PFD Exceptions

43. Finally, for both NGSO and GSO FSS systems operating in the 37.5-40.0 GHz band, we seek comment on the percentage of time during which licensees may exceed the proposed PFD limits that would apply when fade conditions exist. WRC-2000 did not establish a percentage of time during which FSS links could operate at increased power levels to overcome fade conditions, but called for further study.⁷⁶ We request comment on the appropriate percentage of time we should permit operations that exceed our proposed PFD limits for NGSO and GSO FSS systems in the 37.5-40.0 GHz band. We also seek comment on whether we should define the fade conditions that must exist before licensees are allowed to operate in excess of our proposed PFD limits for FSS systems. For example, should operations that exceed the proposed PFD limits be measured against a weekly, monthly or quarterly standard? Should we impose a fixed time limit by which operations at the more relaxed PFD limits must end even if the fade conditions have not dissipated? And, if we adopt time limits or other limiting mechanisms, how should these limits be enforced? We seek comment on how we should implement the PFD limits exceptions we have proposed and seek specific comment on how best to explain and limit these restrictions in section 25.208 of our rules.

44. We believe that adopting these modifications of the Article S21 provisional PFD limits adopted by WRC-2000 strike the appropriate balance between protecting terrestrial operations in this band and providing for FSS gateway operations. We seek comment on our proposal to restrict FSS operations in the 37.5-40.0 GHz band to offer more protection to the Fixed and Mobile services. These proposed changes are shown in Appendix B.

D. Satellite Earth Stations

1. Proposed Ban on Certain Satellite Earth Stations in the 37.5-40.0 GHz Band

⁷⁵ See *Submission of the United States of America to ITU-R Working Party 4-9S* (Doc. 4-9S/31). Pursuant to Resolution 84, the ITU-R charged Working Party 4-9S with determining the adequacy of the WRC-2000 provisional PFD limits for this band. Working Party currently is considering the appropriate value.

⁷⁶ See Res. 84, *Invites ITU-R 7* (WRC-2000).

45. Consistent with the results of WRC-2000, we have proposed to use PFD limits to separate spectrum designated predominantly for terrestrial uses from spectrum designated predominantly for satellite uses; however, technical improvements may one day permit satellite operators to deploy ubiquitous satellite earth stations that use frequencies in the 37.5-40.0 GHz band and still comply with the more restrictive PFD limits that we have proposed for this band.

46. Prior to WRC-2000, wireless and satellite service proponents reached an agreement that, among other things, established wireless services as the predominant use of the 37.5-40.0 GHz band. We believe that the potential ubiquitous deployment of satellite earth stations in the 37.5-40.0 GHz band threatens to defeat the WRC-2000 consensus that wireless services should constitute the predominant use of this band. Because other bands remain available for exclusive satellite services use, we propose to limit the satellite earth station operations that a Part 101 licensee may deploy in its license area in the 37.5-40.0 GHz band only to "gateway" facilities.⁷⁷

47. We propose to restrict the use of a "gateway facility" in the 37.5-40.0 GHz band by modifying Section 25.202(a)(1) of our rules to state that "satellite earth station facilities in this band may not be ubiquitously deployed and may not be used to serve individual consumers." We propose to restrict "gateway" station use in this band for two reasons. First, such a restriction would preserve the proposed designation of the 37.5-40.0 GHz band primarily for use by wireless services. Second, this restriction would permit satellite "gateways" to be deployed at large installations or large corporate campuses without generating the types of ubiquitous, consumer-level deployments that would defeat the designation of wireless services as the predominant use in this band. We seek comment on our proposal to limit the 37.5-40.0 GHz band to use by satellite earth station gateways, on our proposed restrictions on "gateway" terminals, and on whether limiting the flexibility of Part 101 licensees in this band is appropriate.

2. Application of Part 101 Rules

48. We also seek comment on how we should apply our Part 101 rules governing certain portions of the 36.0-51.4 GHz band to future operations of FSS earth stations.⁷⁸ Part 101 licensed service areas for this band vary in shape and size. Two distinct categories of service areas are relevant: Economic Areas (EAs) and licensee-defined areas. First, a Part 101 EA license grants the licensee blanket authority to construct and operate terrestrial fixed stations in a specified EA.⁷⁹ Second, an "incumbent" Part 101 license grants the licensee similar rights in its licensed area, which is generally rectangular in shape and defined based on the individual service requirements of the licensee. Although we have stated that satellite licensees "may eventually be afforded opportunities to use the spectrum designated for wireless services, consistent with the U.S. Table of Frequency Allocations," we have not addressed precisely how we would apply our Part 101 Rules to a satellite service licensee that applies for a Part 101 license.⁸⁰

⁷⁷ Part 101 of our rules governs terrestrial fixed microwave services. See 47 C.F.R. §§ 101.1 - 101.1209.

⁷⁸ TRW Inc. (TRW) has sought a waiver of those Part 101 rules it believes prevent it from providing fixed-satellite service in the 38.6 - 40.0 GHz band. See TRW, Inc., File No. 0000137436, FCC Form 601, Exhibit F (filed May 24, 2000).

⁷⁹ 47 C.F.R. § 101.147; see also 47 C.F.R. § 101.149 (explaining terms and conditions of EA licenses).

⁸⁰ See *36-51 GHz Reconsideration Order*, 15 FCC Rcd at 1769; cf. *TRW Inc., Request for Waiver of the Commission's Rules to Provide Fixed Satellite Service in the 39 GHz Band*, Memorandum Opinion and Order, DA No. 01-371 __ FCC Rcd __ at ¶ 11 (rel., March 12, 2001) (taking an opportunity to "amplify[ing] what is permitted under the Commission's Part 101 Rules").

49. Accordingly, we seek comment on the following proposed changes to the Commission's rules relating to the operation of FSS earth stations in the 37.5 – 40.0 GHz band. As noted previously, an FSS earth station applicant may obtain authority to operate within the 37.5 – 40.0 GHz band by securing a Part 101 EA license or reaching an agreement with a Part 101 licensee in the area in which it wants to operate its earth station(s).⁸¹ Under either method, the earth station operator must also secure a Part 25 license to operate the FSS earth station. To address interference concerns, we propose that the earth station(s) be treated the same as terrestrial stations operating under Part 101 of our rules. For an EA licensee, coordination is required for any and all of the stations that it intends to locate within 16 km of the boundary of its licensed area. Consistent with this approach, we propose that such an earth station not be entitled to protection from other Part 101 EA licensed stations that are further than 16 km from its EA boundary. Likewise, under our proposal, a non-earth station Part 101 licensee in another EA would have to coordinate all of its proposed stations within 16 km of the boundary of its licensed area with all FSS earth stations within 16 km of the boundaries of adjacent areas. In the case of an FSS earth station operating in an EA under agreement with the Part 101 EA licensee of that area, the affected parties would address the resolution of any interference between the earth station and stations of the EA licensee under the terms of their agreement.

50. As indicated above, "incumbent" Part 101 licensees also operate in the 38.6-40 GHz band with self-defined license areas that are not EAs. We propose to apply the same approach to EA licensees and the "incumbents" for purposes of coordination and interference resolution. Both the FSS earth station licensee and the incumbent Part 101 licensee would receive the same treatment. Under this proposal, an earth station would not receive protection in an area inside the boundary of an incumbent Part 101 licensee that is completely or partially located inside the licensed EA. In addition, an FSS earth station would not receive protection from an incumbent Part 101 licensee, if the earth station is located more than 16 km from the border of the incumbent's licensed area. An incumbent licensee that implements new stations within 16 km of the boundary of its licensed area, however, would have to protect any affected FSS earth station located within 16 km of that boundary.

51. Finally, we note that FSS earth stations may be implemented with technical characteristics that vary significantly from those of Part 101 licensees. Because we have designated the spectrum below 40.0 GHz for wireless services, we do not wish the implementation of FSS earth stations in this portion of the spectrum to pose an onerous coordination burden on wireless services in this band. Thus, we propose that the level of protection granted to FSS earth stations during the coordination process should be comparable to that provided to other terrestrial fixed stations operating in this band. We request comment on how best to achieve this aim within the context of the coordination procedures of Part 101 rules.

V. PROCEDURAL INFORMATION

A. Initial Regulatory Flexibility Analysis

52. As required by Section 603 of the Regulatory Flexibility Act (RFA) of 1980,⁸² the Commission has prepared an Initial Regulatory Flexibility Analysis (IRFA) of the possible significant economic impact on small entities of the policies and rules proposed in this Further Notice. The IRFA appears in Appendix A. We request written public comment on the IRFA. Comments on the IRFA should be filed in accordance with the instructions in paragraphs 57 through 59 below.

⁸¹ See *36-51 GHz Reconsideration Order*, 15 FCC Rcd at 1770 (citation omitted).

⁸² See 5 U.S.C. § 603.

53. Comments on the IRFA must be filed in accordance with the same filing deadlines as comments filed to the Notice of Proposed Rule Making, but they must have a separate and distinct heading designating them as responses to the IRFA.

B. Paperwork Reduction Analysis

54. The Notice of Proposed Rule Making contains a proposed information collection. As part of our continuing effort to reduce paperwork burdens, we invite the general public and the Office of Management and Budget (OMB) to take this opportunity to comment on the information collections contained in this Notice, as required by the Paperwork Reduction Act of 1995, Pub. L. No. 104-13.⁸³ Public and agency comments are due at the same time as other comments on this Notice; OMB comments are due 60 days from the date of publication of this Notice in the Federal Register. Comments should address:

- Whether the proposed collection of information is necessary for the proper performance of the functions of the Commission, including whether the information shall have practical utility.
- The accuracy of the Commission's burden estimates.
- Ways to enhance the quality, utility, and clarity of the information collected.
- Ways to minimize the burden of the collection of information on the respondents, including the use of automated collection techniques or other forms of information technology.

55. Written comments by the public on the proposed information collections are due 60 days after the date of publication in the Federal Register. Written comments must be submitted by the OMB on the proposed information collections on or before 60 days after the date of publication in the Federal Register. In addition to filing comments with the Secretary, a copy of any comments on the information collections contained herein should be submitted to Judy Boley, Federal Communications Commission, Room 1-C804, 445 12th Street, S.W., Washington, D.C. 20554, or via the Internet to jboley@fcc.gov, and to Virginia Huth, OMB Desk Officer, 10236 New Executive Office Building, 725 17th Street, N.W., Washington, D.C. 20503, or via the Internet to fain_t@al.eop.gov.

C. Ex Parte Presentations

56. For purposes of this permit-but-disclose notice-and-comment rulemaking proceeding, members of the public are advised that *ex parte* presentations are permitted, except during the Sunshine Agenda period, provided they are disclosed under the Commission's Rules.⁸⁴

D. Comment Dates

57. Under Sections 1.415 and 1.419 of the Commission's Rules, 47 C.F.R. §§ 1.415, 1.419, interested parties may file comments on the Further Notice of Proposed Rule Making on or before due 60 days after the date of publication in the Federal Register. Reply comments are due 90 days after the date of publication in the Federal Register. Interested parties may file comments by using the Commission's

⁸³ See generally 44 U.S.C. §§ 3501-3520.

⁸⁴ See generally 47 C.F.R. §§ 1.1202, 1.1203, 1.1206(a).

Electronic Comment Filing System (ECFS) or by filing paper copies.⁸⁵ The Commission will consider all relevant and timely comments prior to taking final action in this proceeding. To file formally, interested parties must file an original and four copies of all comments, reply comments, and supporting comments. If interested parties want each Commissioner to receive a personal copy of their comments, they must file an original plus nine copies. Interested parties should send comments and reply comments to the Office of the Secretary, Federal Communications Commission, 445 12th Street, S.W., Washington, D.C. 20554. Parties not filing via ECFS are also encouraged to file a copy of all pleadings on a 3.5-inch diskette in Word 97 format.

58. Comments filed through the ECFS can be sent as an electronic file via the Internet to <http://www.fcc.gov/e-file/ecfs.html>. Generally, only one copy of an electronic submission must be filed. In completing the transmittal screen, commenters should include their full name, Postal Service mailing address, and the applicable docket or rulemaking number. Parties may also submit an electronic comment by Internet e-mail. To receive filing instructions for e-mail comments, commenters should send an e-mail to ecfs@fcc.gov, and should include the following words in the body of the message: "get form <your e-mail address>." A sample form and directions will be sent in reply.

59. Parties who choose to file by paper must file an original and four copies of each filing. If more than one docket or rulemaking number appears in the caption of this proceeding, commenters must submit two additional copies for each additional docket or rulemaking number. All filings must be sent to the Commission's Secretary, Magalie Roman Salas, Office of the Secretary, Federal Communications Commission, 445 12th Street, S.W., Washington, D.C. 20554.

60. Comments and reply comments will be available for public inspection during regular business hours in the FCC Reference Center, 445 12th Street, S.W., Washington, D.C. 20554. Comments are also available on the ECFS, at https://gullfoss2.fcc.gov/cgi-bin/websql/prod/ecfs/comsrch_v2.htm.

A. Further Information

61. For further information concerning the Further Notice of Proposed Rulemaking, contact the International Bureau – Trey Hanbury at (202) 418-0766 or Charlie Breig at (202) 418-2156.

VI. ORDERING CLAUSES

62. Accordingly, **IT IS ORDERED** that, pursuant to Sections 1, 4(i), 301, 302, 303(e), 303(f), 303(g), 303(r), 304, and 307 of the Communications Act of 1934, as amended, 47 U.S.C. §§ 154(i), 301, 302, 303(e), 303(f), 303(g), 303(r), 304, and 307, this Further Notice of Proposed Rulemaking and Order **IS ADOPTED**.

⁸⁵ See *Electronic Filing of Documents in Rulemaking Proceedings*, Memorandum Opinion and Order, 13 FCC Rcd 21517 (1998); *Electronic Filing of Documents in Rulemaking Proceedings*, Report and Order, 13 FCC Rcd 11322 (1998).

63. **IT IS FURTHER ORDERED** that the Commission's Consumer Information Bureau, Reference Information Center, **SHALL SEND** a copy of this Further Notice of Proposed Rulemaking, including the Initial Regulatory Flexibility Analysis, to the Chief Counsel for Advocacy of the Small Business Administration..

FEDERAL COMMUNICATIONS COMMISSION

A handwritten signature in black ink, appearing to read "Magalie Roman Salas", written over the printed name.

Magalie Roman Salas
Secretary

Appendix A

Initial Regulatory Flexibility Analysis

As required by the Regulatory Flexibility Act (RFA),⁸⁶ the Commission has prepared this present Initial Regulatory Flexibility Analysis (IRFA) of the possible significant economic impact on small entities by the policies and rules proposed in this Further Notice of Proposed Rulemaking. Written public comments are requested on this IRFA. Comments must be identified as responses to the IRFA and must be filed by the deadlines for comments on the Further Notice of Proposed Rulemaking provided above in [section or paragraph cite]. The Commission will send a copy of the Further Notice of Proposed Rulemaking, including this IRFA, to the Chief Counsel for Advocacy of the Small Business Administration. See 5 U.S.C. § 603(a). In addition, the Further Notice of Proposed Rulemaking and IRFA (or summaries thereof) will be published in the Federal Register. See *id.*

A. Need for and Objectives of the Proposed Rules

In this Further Notice of Proposed Rulemaking, we propose to modify the band segmentation plan governing operations in the 36.0-51.4 GHz band to reflect decisions reached at the 2000 World Radiocommunication Conference (WRC-2000).⁸⁷ To provide satellite and terrestrial operators with greater certainty about the scope of operations in this band, we also propose specific power flux density (PFD) limits on satellite operations in portions of this band.⁸⁸

In this Further Notice, we propose to re-designate the 41.0-42.0 GHz band for satellite services and the 37.6-38.6 GHz band for wireless services and to add a designation to the 40.5-41.0 GHz band for MSS. We also propose to adopt or consider adopting several changes to the table of frequency allocations, including: adding an FSS allocation in the 37.5-37.6 GHz band that would give FSS gateways more flexibility by allowing access to an additional 100 megahertz of spectrum; shifting the MSS allocation from the 39.5-40.0 GHz band to the 40.5-41.0 GHz band to meet specific U.S. government requirements, including NATO treaty obligations; adding a primary government FSS allocation to the 40.5-41.0 GHz band to offset our proposal to designate the 37.0 – 40.0 GHz band for wireless services that would eliminate a portion of the one gigahertz of spectrum that the U.S. government has sought for its use; adding a primary FSS allocation in the 41.0-42.0 GHz band to shift FSS to above 40 GHz, while maintaining the 2 gigahertz of spectrum we have designated for its use; adding non-government fixed and mobile services to the 42.5-43.5 GHz band that is currently available only for U.S. government use; and providing additional protection to Radio Astronomy in the 42.5-43.5 GHz band.

B. Legal Basis

The proposed action is taken pursuant to Sections 1, 4(i), 301, 302, 303(e), 303(f), 303(g), 303(r), 304, and 307 of the Communications Act of 1934, as amended, 47 U.S.C. §§ 151, 154(i), 301, 302,

⁸⁶ See 5 U.S.C. § 603. The RFA, *see* 5 U.S.C. § 601 *et. seq.*, has been amended by the Contract With America Advancement Act of 1996, Pub. L. No. 104-121, 110 Stat. 847 (1996) (CWAAA). Title II of the CWAAA is the Small Business Regulatory Enforcement Fairness Act of 1996 (SBREFA).

⁸⁷ See, e.g., ¶¶ 12-14 *supra*.

⁸⁸ See ¶¶ 34-44 *supra*.

303(e), 303(f), 303(g), 303(r), 304, and 307.

C. Description and Estimate of the Number of Small Entities to Which the Proposed Rules Will Apply

The RFA directs agencies to provide a description of, and, where feasible, an estimate of the number of small entities that may be affected by the proposed rules, if adopted.⁸⁹ The RFA generally defines the term "small entity" as having the same meaning as the terms "small business," "small organization," and "small governmental jurisdiction."⁹⁰ In addition, the term "small business" has the same meaning as the term "small business concern" under the Small Business Act.⁹¹ A small business concern is one which: (1) is independently owned and operated; (2) is not dominant in its field of operation; and (3) satisfies any additional criteria established by the Small Business Administration (SBA).⁹² A small organization is generally "any not-for-profit enterprise which is independently owned and operated and is not dominant in its field."⁹³ Nationwide, as of 1992, there were approximately 275,801 small organizations.⁹⁴ "Small governmental jurisdiction"⁹⁵ generally means "governments of cities, counties, towns, townships, villages, school districts, or special districts, with a population of less than 50,000."⁹⁶ As of 1992, there were approximately 85,006 such jurisdictions in the United States.⁹⁷ This number includes 38,978 counties, cities, and towns; of these, 37,566, or 96 percent, have populations of fewer than 50,000.⁹⁸ The Census Bureau estimates that this ratio is approximately accurate for all governmental entities. Thus, of the 85,006 governmental entities, we estimate that 81,600 (96 percent) are small entities.

Regarding future satellite use of the bands that are the subject of this rulemaking, the Commission has not developed a definition of small entities applicable to geostationary or non-geostationary orbit fixed-satellite service applicants or licensees. Therefore, the applicable definition of small entity is the definition

⁸⁹ 5 U.S.C. § 603(b)(3).

⁹⁰ 5 U.S.C. § 601(6).

⁹¹ 5 U.S.C. § 601(3) (incorporating by reference the definition of "small business concern" in 15 U.S.C. § 632). Pursuant to the RFA, the statutory definition of a small business applies "unless an agency, after consultation with the Office of Advocacy of the Small Business Administration and after opportunity for public comment, establishes one or more definitions of such term which are appropriate to the activities of the agency and publishes such definition(s) in the Federal Register." 5 U.S.C. § 601(3).

⁹² Small Business Act, 15 U.S.C. § 632 (1996).

⁹³ 5 U.S.C. § 601(4).

⁹⁴ 1992 Economic Census, U.S. Bureau of the Census, Table 6 (special tabulation of data under contract to Office of Advocacy of the U.S. Small Business Administration).

⁹⁵ 47 CFR 1.1162

⁹⁶ 5 U.S.C. 601(5).

⁹⁷ U.S. Dept. of Commerce, Bureau of the Census, "1992 Census of Governments."

⁹⁸ Id.

under the Small Business Administration (SBA) rules applicable to Communications Services, Not Elsewhere Classified. This definition provides that a small entity is one with \$11.0 million or less in annual receipts.⁹⁹ According to Census Bureau data, there are 848 firms that fall under the category of Communications Services, Not Elsewhere Classified, which could potentially fall into the geostationary or non-geostationary orbit fixed-satellite service category. Of those, approximately 775 reported annual receipts of \$11 million or less and qualify as small entities.¹⁰⁰ Generally, these NGSO and GSO FSS systems cost several millions of dollars to construct and operate. Therefore the NGSO and GSO FSS companies, or their parent companies, rarely qualify under this definition as a small entity. In addition, the proposed rules may affect allocations for the space research (passive) and radio astronomy services. There are no small entities affected by this action because only Federal agencies currently make use of these services.

We note that the rules proposed in this order provide spectrum for future wireless and satellite licensees and the proposal would not affect any current non-Federal Government users. Regarding future terrestrial fixed and mobile use of the subject bands, the definition of small entity under the SBA rules for the radiotelephone industry provides that a small entity is a radiotelephone company employing no more than 1,500 persons.¹⁰¹ The 1992 Census of Transportation, Communications, and Utilities, conducted by the Bureau of the Census, which is the most recent information available, shows that only 12 radiotelephone firms out of a total of 1,178 such firms that operated during 1992 had 1,000 or more employees.¹⁰² While we cannot at this time know precisely which entities will ultimately be utilizing all the subject spectrum, the following services are possibilities:

Fixed Microwave Services. Microwave services include common carrier,¹⁰³ private-operational fixed,¹⁰⁴ and broadcast auxiliary radio services.¹⁰⁵ At present, there are approximately 22,015 common carrier fixed licensees and 61,670 private operational-fixed licensees and broadcast auxiliary radio licensees in the microwave services. The Commission has not yet defined a small business with respect to microwave services. For purposes of this IRFA, we will use the SBA's definition applicable to radiotelephone

⁹⁹ See 13 C.F.R. § 121.201, Standard Industrial Classification (SIC) Code 4899.

¹⁰⁰ U.S. Bureau of Census, U.S. Department of Commerce, 1992 Census of Transportation, Communications, Utilities, UC92-S-1, Subject Series, Establishment and Firm Size, Table 2D, Employment Size of Firms: 1992, SIC Code 4899 (issued May 1995).

¹⁰¹ See 13 C.F.R. § 121.201, Standard Industrial Classification (SIC) Code 4812.

¹⁰² U.S. Bureau of the Census, U.S. Department of Commerce, 1992 Census of Transportation, Communications, and Utilities, UC92-S-1, Subject Series, Establishment and Firm Size, Table 5, Employment Size of Firms: 1992, SIC Code 4812 (issued May 1995).

¹⁰³ 47 CFR 101 et seq. (formerly, part 21 of the Commission's Rules).

¹⁰⁴ Persons eligible under parts 80 and 90 of the Commission's rules can use Private Operational-Fixed Microwave services. See 47 CFR parts 80 and 90. Stations in this service are called operational-fixed to distinguish them from common carrier and public fixed stations. Only the licensee may use the operational-fixed station, and only for communications related to the licensee's commercial, industrial, or safety operations.

¹⁰⁵ Auxiliary Microwave Service is governed by part 74 of Title 47 of the Commission's Rules. See 47 CFR 74 et seq. Available to licensees of broadcast stations and to broadcast and cable network entities, broadcast auxiliary microwave stations are used for relaying broadcast television signals from the studio to the transmitter, or between two points such as a main studio and an auxiliary studio. The service also includes mobile TV pickups, which relay signals from a remote location back to the studio.

companies -- i.e., an entity with no more than 1,500 persons.¹⁰⁶ We estimate that all of the Fixed Microwave licensees (excluding broadcast auxiliary licensees) would qualify as small entities under the SBA definition for radiotelephone companies.

39 GHz Service. The Commission defined “small entity” for 39 GHz licenses as an entity that has average gross revenues of less than \$40 million in the three previous calendar years.¹⁰⁷ An additional classification for “very small business” was added and is defined as an entity that, together with their affiliates, has average gross revenues of not more than \$15 million for the preceding three calendar years.¹⁰⁸ These regulations defining “small entity” in the context of 39 GHz auctions have been approved by the SBA. The auction of the 2,173 39 GHz licenses began on April 12, 2000 and closed on May 8, 2000. The 18 bidders who claimed small business status won 849 licenses.

Local Multipoint Distribution Service. The auction of the 1,030 Local Multipoint Distribution Service (LMDS) licenses began on February 18, 1998 and closed on March 25, 1998. The Commission defined “small entity” for LMDS licenses as an entity that has average gross revenues of less than \$40 million in the three previous calendar year.¹⁰⁹ An additional classification for “very small business” was added and is defined as an entity that, together with their affiliates, has average gross revenues of not more than \$15 million for the preceding three calendar years.¹¹⁰ These regulations defining “small entity” in the context of LMDS auctions have been approved by the SBA. There were 93 winning bidders that qualified as small entities in the LMDS auctions. A total of 93 small and very small business bidders won approximately 277 A Block licenses and 387 B Block licenses. On March 27, 1999, the Commission re-auctioned 161 licenses; there were 40 winning bidders. Based on this information, we conclude that the number of small LMDS licenses will include the 93 winning bidders in the first auction and the 40 winning bidders in the re-auction, for a total of 133 small entity LMDS providers as defined by the SBA and the Commission’s auction rules.

D. Description of Projected Reporting, Recordkeeping and Other Compliance Requirements

None. No incumbents are effected by this proposed action. The only service rule changes proposed concern power flux density limits and frequency tolerance and emission limitations, which do not have associated compliance burdens.

E. Steps Taken to Minimize Significant Economic Impact on Small Entities, and

¹⁰⁶ 13 CFR 121.201, SIC 4812.

¹⁰⁷ See In the Matter of Amendment of the Commission’s Rules Regarding the 37.0-38.6 GHz and 38.6-40.0 GHz Band, *Report and Order*, 12 FCC Rcd 18600 (1997).

¹⁰⁸ Id.

¹⁰⁹ See Local Multipoint Distribution Service, *Second Report and Order*, 12 FCC Rcd 12545 (1997).

¹¹⁰ Id.

Significant Alternatives Considered

The RFA requires an agency to describe any significant alternatives that it has considered in reaching its proposed approach, which may include the following four alternatives (among others): (1) the establishment of differing compliance or reporting requirements or timetables that take into account the resources available to small entities; (2) the clarification, consolidation, or simplification of compliance or reporting requirements under the rule for small entities; (3) the use of performance, rather than design, standards; and (4) an exemption from coverage of the rule, or any part thereof, for small entities.¹¹¹

In this Further Notice of Proposed Rulemaking, we propose to modify the band segmentation plan governing operations in the 36.0-51.4 GHz band to reflect decisions reached at the 2000 World Radiocommunication Conference (WRC-2000). We also propose specific power flux density (PFD) limits on satellite operations in portions of this band.

We are initiating this proceeding so solicit comment on how best to domestically accommodate the changes to the international Radio Regulations adopted at WRC-000. The proposed changes to the domestic allocations seek to maximize efficient use of the radio spectrum by both satellite and terrestrial uses, with minimal changes to the existing Table of Allocations. These changes will provide satellite and terrestrial operators, including small entity operators, with greater certainty about the scope of operations in this band.

Currently, with our proposal primarily attempting to settle spectrum allocation and segmentation issues, there are few alternatives being considered other than frequency parameters. Nevertheless, we note that with respect to power flux density limits, we considered the alternative of delaying the implementation of such limits until after the outcome of WRC-2003 to take into account further studies regarding the issue taking place at the International Telecommunication Union. However, we rejected this proposal, concluding that U.S. terrestrial licensees, including small entities, would benefit greatly in the designing and deployment of their systems by knowing with certainty the limits that would apply in the United States.¹¹² Similarly, we considered and rejected alternative band sharing and hard segmentation plans because those alternatives might be overly burdensome to licensees, including small entity operators, or might overly restrict flexible future uses of the bands.¹¹³

F. Federal Rules that May Duplicate, Overlap, or Conflict with the Proposed Rules

None.

¹¹¹ See 5 U.S.C. § 603.

¹¹² See § 40 *supra*.

¹¹³ See § 8 *supra*.

Appendix B: Proposed Rules

Parts 2, 25, and 101 of title 47 of the Code of Federal Regulations are proposed to be amended as follows:

**PART 2 – FREQUENCY ALLOCATIONS AND RADIO TREATY MATTERS;
GENERAL RULES AND REGULATIONS**

1. The authority citation for part 2 continues to read as follows:

AUTHORITY: 47 U.S.C. 154, 302a, 303, and 336, unless otherwise noted.
2. Section 2.106, the Table of Frequency Allocations, is amended as follows:
 - a. Revise pages 76, 77, and 78.
 - b. Add, under International Footnotes, New "S" Numbering Scheme footnotes S5.551AA and S5.551G in numerical order and remove footnotes S5.551.B, S551.C, S551.D, and S551.E.
 - c. Add United States footnotes USXXX and USYYY in numerical order.
 - d. Revise Government footnote G117.

The revisions and additions read as follows:

§ 2.106 Table of Frequency Allocations.

* * * * *

36-37 EARTH EXPLORATION-SATELLITE (passive) FIXED MOBILE SPACE RESEARCH (passive) S5.149	36-37 EARTH EXPLORATION-SATELLITE (passive) FIXED MOBILE SPACE RESEARCH (passive) US263 US342	
37-37.5 FIXED MOBILE SPACE RESEARCH (space-to-Earth) S5.547	37-37.5 FIXED MOBILE SPACE RESEARCH (space-to-Earth)	
37.5-38 FIXED FIXED-SATELLITE (space-to-Earth) S5.551AA MOBILE SPACE RESEARCH (space-to-Earth) Earth exploration-satellite (space-to-Earth) S5.547	37.5-38.6 FIXED FIXED-SATELLITE (space-to-Earth) MOBILE	Satellite Communications (25)
38-39.5 FIXED FIXED-SATELLITE (space-to-Earth) S5.551AA MOBILE Earth exploration-satellite (space-to-Earth)	38-38.6 FIXED MOBILE 38.6-39.5	
S5.547	US291	Auxiliary Broadcasting (74) Fixed Microwave (101) Satellite Communications (25)
39.5-40 FIXED FIXED-SATELLITE (space-to-Earth) S5.551AA MOBILE MOBILE-SATELLITE (space-to-Earth) Earth exploration-satellite (space-to-Earth) S5.547	39.5-40 FIXED FIXED-SATELLITE (space-to-Earth) MOBILE-SATELLITE (space-to-Earth) US291 USYYY G117 US291 USYYY	

40-50.2 GHz (EHF)				Page 77	
International Table				FCC Rule Part(s)	
Region 1	Region 2	Region 3	United States Table		
			Federal Government	Non-Federal Government	
40-40.5 EARTH EXPLORATION-SATELLITE (Earth-to-space) FIXED FIXED-SATELLITE (space-to-Earth) MOBILE MOBILE-SATELLITE (space-to-Earth) SPACE RESEARCH (Earth-to-space) Earth exploration-satellite (space-to-Earth)			40-40.5 EARTH EXPLORATION-SATELLITE (Earth-to-space) FIXED-SATELLITE (space-to-Earth) MOBILE-SATELLITE (space-to-Earth) SPACE RESEARCH (Earth-to-space) Earth exploration-satellite (space-to-Earth) G117	40-40.5 FIXED-SATELLITE (space-to-Earth) MOBILE-SATELLITE (space-to-Earth)	Satellite Communications (25)
40.5-41 FIXED FIXED-SATELLITE (space-to-Earth) BROADCASTING-BROADCASTING-SATELLITE Mobile Mobile-satellite (space-to-Earth)	40.5-41 FIXED FIXED-SATELLITE (space-to-Earth) BROADCASTING-BROADCASTING-SATELLITE Mobile Mobile-satellite (space-to-Earth)	40.5-41 FIXED FIXED-SATELLITE (space-to-Earth) BROADCASTING-BROADCASTING-SATELLITE Mobile	40.5-41 FIXED-SATELLITE (space-to-Earth) MOBILE-SATELLITE (space-to-Earth)	40.5-41 FIXED-SATELLITE (space-to-Earth) BROADCASTING-BROADCASTING-SATELLITE Mobile Mobile-satellite (space-to-Earth) Fixed	
S5.547 41-42.5 FIXED FIXED-SATELLITE (space-to-Earth) S5.551AA BROADCASTING-BROADCASTING-SATELLITE Mobile	S5.547 S5.547	S5.547	US211 G117 41-42.5	US211 41-42 FIXED FIXED-SATELLITE (space-to-Earth) BROADCASTING-BROADCASTING-SATELLITE MOBILE US211 USXXX 42-42.5 FIXED BROADCASTING-BROADCASTING-SATELLITE MOBILE US211 USXXX	
S5.547 S5.551F S5.551G			US211 USXXX		

42.5-43.5 FIXED FIXED-SATELLITE (Earth-to-space) S5.552 MOBILE except aeronautical mobile RADIO ASTRONOMY	42.5-43.5 FIXED FIXED-SATELLITE (Earth-to-space) MOBILE except aeronautical mobile RADIO ASTRONOMY US342	42.5-43.5 RADIO ASTRONOMY	
S5.149 S5.547		US342	
43.5-47 MOBILE S5.553 MOBILE-SATELLITE RADIONAVIGATION RADIONAVIGATION-SATELLITE	43.5-45.5 MOBILE-SATELLITE (Earth-to-space) FIXED-SATELLITE (Earth-to-space) G117	43.5-45.5	
	45.5-46.9 MOBILE MOBILE-SATELLITE (Earth-to-space) RADIONAVIGATION-SATELLITE S5.554		RF Devices (15)
	46.9-47 MOBILE MOBILE-SATELLITE (Earth-to-space) RADIONAVIGATION- SATELLITE S5.554	46.9-47 MOBILE MOBILE-SATELLITE (Earth-to-space) RADIONAVIGATION- SATELLITE FIXED S5.554	
S5.554			
47-47.2 AMATEUR AMATEUR-SATELLITE	47-48.2	47-47.2 AMATEUR AMATEUR-SATELLITE	Amateur (97)
47.2-50.2 FIXED FIXED-SATELLITE (Earth-to-space) S5.552 MOBILE		47.2-48.2 FIXED FIXED-SATELLITE (Earth-to-space) US297 MOBILE US264	
S5.149 S5.340 S5.552A S5.555	48.2-50.2 FIXED FIXED-SATELLITE (Earth-to-space) US297 MOBILE US264 S5.555 US342		Satellite Communications (25)

INTERNATIONAL FOOTNOTES

I. New "S" Numbering Scheme

S5.551AA In the bands 37.5-40 GHz and 42-42.5 GHz, non-geostationary-satellite systems in the fixed-satellite service should employ power control or other methods of downlink fade compensation of the order of 10 dB, such that the satellite transmissions are at power levels required to meet the desired link performance while reducing the level of interference to the fixed service. The use of downlink fade compensation methods are under study by ITU-R (see Resolution 84 (WRC-2000)).

S5.551G In order to protect the radio astronomy service in the band 42.5-43.5 GHz, the aggregate power flux-density in the 42.5-43.5 GHz band produced by all the space stations in any non-geostationary-satellite system in the fixed-satellite service (space-to-Earth) or in the broadcasting-satellite service (space-to-Earth) system operating in the 41.5-42.5 GHz band shall not exceed $-167 \text{ dB(W/m}^2\text{)}$ in any 1 MHz band at the site of a radio astronomy station for more than 2% of the time. The power flux-density in the band 42.5-43.5 GHz produced by any geostationary station in the fixed-satellite service (space-to-Earth) or in the broadcasting-satellite service (space-to-Earth) operating in the band 42-42.5 GHz shall not exceed $-167 \text{ dB(W/m}^2\text{)}$ in any 1 MHz band at the site of a radio astronomy station. These limits are provisional and will be reviewed in accordance with Resolution 128 (Rev.WRC-2000).

UNITED STATES (US) FOOTNOTES

USXXX To protect the radio astronomy service in the band 42.5-43.5 GHz, the aggregate power flux-density in the 42.5-43.5 GHz band produced by all the space stations in any non-geostationary-satellite system in the fixed-satellite service (space-to-Earth) operating in the 41.5-42.0 GHz band or in the broadcasting-satellite service (space-to-Earth) system operating in the 41.5-42.5 GHz band shall not exceed $-167 \text{ dB(W/m}^2\text{)}$ in any 1 MHz band at the site of a radio astronomy station for more than 2% of the time. The power flux-density in the band 42.5-43.5 GHz produced by any geostationary station in the broadcasting-satellite service (space-to-Earth) operating in the band 42-42.5 GHz shall not exceed $-167 \text{ dB(W/m}^2\text{)}$ in any 1 MHz band at the site of a radio astronomy station.

USYYY In the band 39.5-40 GHz, Government earth stations in the mobile-satellite service (space-to-Earth) shall not claim protection from non-Government stations in the fixed and mobile services. S5.43A does not apply.

GOVERNMENT (G) FOOTNOTES

G117 In the bands 7.25-7.75 GHz, 7.9-8.4 GHz, 17.8-21.2 GHz, 30-31 GHz, 33-36 GHz, 39.5-41 GHz,

43.5-45.5 GHz and 50.4-51.4 GHz, the Government fixed-satellite and mobile-satellite services are limited to military systems.

* * * * *

PART 25—SATELLITE COMMUNICATIONS

3. The authority citation for Part 25 continues to read as follows:

AUTHORITY: 47 U.S.C. 701-744. Interprets or applies sec. 303, 47 U.S.C. 303. 47 U.S.C. sections 154, 301, 302, 303, 307, 309, and 332, unless otherwise noted.

4. Section 25.202(a)(1) is proposed to be revised as follows:

§ 25.202 Frequencies, frequency tolerance and emission limitations.

(a)(1) Frequency band. The following frequencies are available for use by the fixed-satellite service. Precise frequencies and bandwidths of emission shall be assigned on a case-by-case basis.

Space-to-Earth (GHz)	Earth-to-space (GHz)
3.7-4.2 ¹	5.925-6.425 ¹
10.7-10.95 ^{1, 12}	12.75-13.15 ^{1, 12}
10.95-11.2 ^{1, 2, 12}	13.2125-13.25 ^{1, 12}
11.2-11.45 ^{1, 12}	13.75-14 ^{4, 12}
11.45-11.7 ^{1, 2, 12}	14-14.2 ⁵
11.7-12.2 ³	14.2-14.5
12.2-12.7 ¹³	17.3-17.8 ⁹
18.3-18.58 ^{1, 10}	27.5-29.5 ¹
18.58-18.8 ^{6, 10, 11}	29.5-30
18.8-19.3 ^{7, 10}	48.2-50.2
19.3-19.7 ^{8, 10}	
19.7-20.2 ¹⁰	
37.5-40 ¹⁴	
40-42	

¹ This band is shared coequally with terrestrial radiocommunication services.

² Use of this band by geostationary satellite orbit satellite systems in the fixed-satellite service is limited to international systems; *i.e.*, other than domestic systems.

³ Fixed-satellite transponders may be used additionally for transmissions in the broadcasting-satellite service.

⁴ This band is shared on an equal basis with the Government radiolocation service and grandfathered space stations in the Tracking and Data Relay Satellite System.

⁵ In this band, stations in the radionavigation service shall operate on a secondary basis to the fixed-satellite service.

⁶ The band 18.58-18.8 GHz is shared co-equally with existing terrestrial radiocommunication systems until June 8, 2010.

⁷ The band 18.8-19.3 GHz is shared co-equally with terrestrial radiocommunication services, until June 8, 2010. After this date, the sub-band 19.26-19.3 GHz is shared co-equally with existing terrestrial radiocommunication systems.

⁸ The use of the band 19.3-19.7 GHz by the fixed-satellite service (space-to-Earth) is limited to feeder links for the mobile-satellite service.

⁹ The use of the band 17.3-17.8 GHz by the fixed-satellite service (Earth-to-space) is limited to feeder links for broadcasting-satellite service, and the sub-band 17.7-17.8 GHz is shared co-equally with terrestrial fixed services.

¹⁰ This band is shared co-equally with the Federal Government fixed-satellite service.

¹¹ The band 18.6-18.8 GHz is shared co-equally with the non-Federal Government and Federal Government Earth exploration-satellite (passive) and space research (passive) services.

¹² Use of this band by non-geostationary satellite orbit systems in the fixed-satellite service is limited to gateway earth station operations.

¹³ Use of this band by the fixed-satellite service is limited to non-geostationary satellite orbit systems.

¹⁴ Use of this band by the fixed-satellite service is limited to "gateway" earth station operations, provided the licensee under this Part obtains a license under Part 101 of this Chapter or an agreement from a Part 101 licensee for the area in which an earth station is to be located. Satellite earth station facilities in this band may not be ubiquitously deployed and may not be used to serve individual consumers.

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5. Section 25.208 is proposed to be amended by adding new paragraphs (n), (o), (p), (q) and (r) to read as follows:

§ 25.208 Power flux-density limits.

* * * * *

(n) In the band 37.5-40.0 GHz, the power flux-density at the Earth's surface produced by emissions from a non-geostationary space station for all conditions and for all methods of modulation shall not exceed the following values:

-132 dB(W/m²) in any 1 MHz band for angles of arrival between 0 and 5 degrees above the horizontal plane;

-132 + 0.75 (δ-5) dB(W/m²) in any 1 MHz band for angles of arrival δ (in degrees) between 5 and 25 degrees above the horizontal plane; and

-117 dB(W/m²) in any 1 MHz band for angles of arrival between 25 and 90 degrees above the horizontal plane;

These limits relate to the power flux-density that would be obtained under assumed free-space propagation conditions. These PFD limits may be exceeded by up to 12 dB under fade conditions.

(o) In the band 37.5-40.0 GHz, the power flux-density at the Earth's surface produced by emissions from a geostationary space station for all conditions and for all methods of modulation shall not exceed the following values:

-139 dB(W/m²) in any 1 MHz band for angles of arrival between 0 and 5 degrees above the horizontal plane;

-139 + 4/3 (δ-5) dB(W/m²) in any 1 MHz band for angles of arrival δ (in degrees) between 5 and 20 degrees above the horizontal plane; and

$-119 + 0.4 (\delta - 20)$ dB(W/m²) in any 1 MHz band for angles of arrival δ (in degrees) between 20 and 25 degrees above the horizontal plane;

-117 dB(W/m²) in any 1 MHz band for angles of arrival between 25 and 90 degrees above the horizontal plane;

These limits relate to the power flux-density that would be obtained under assumed free-space propagation conditions. These PFD limits may be exceeded by up to 12 dB under fade conditions.

- (p) In the band 40.0- 40.5 GHz, the power flux-density at the Earth's surface produced by emissions from a space station for all conditions and for all methods of modulation shall not exceed the following values:

-115 dB(W/m²) in any 1 MHz band for angles of arrival between 0 and 5 degrees above the horizontal plane;

$-115 + 0.5 (\delta - 5)$ dB(W/m²) in any 1 MHz band for angles of arrival δ (in degrees) between 5 and 25 degrees above the horizontal plane; and

-105 dB(W/m²) in any 1 MHz band for angles of arrival between 25 and 90 degrees above the horizontal plane;

These limits relate to the power flux-density that would be obtained under assumed free-space propagation conditions.

- (q) In the band 40.5-42.0 GHz, the power flux density at the Earth's surface produced by emissions from a non-geostationary space station for all conditions and for all methods of modulation shall not exceed the following values:

-115 dB(W/m²) in any 1 MHz band for angles of arrival between 0 and 5 degrees above the horizontal plane;

$-115 + 0.5 (\delta - 5)$ dB(W/m²) in any 1 MHz band for angles of arrival δ (in degrees) between 5 and 25 degrees above the horizontal plane; and

-105 dB(W/m²) in any 1 MHz band for angles of arrival between 25 and 90 degrees above the horizontal plane;

These limits relate to the power flux density that would be obtained under assumed free-space propagation conditions.

- (r) In the band 40.5-42.0 GHz, the power flux-density at the Earth's surface produced by emissions from a geostationary space station for all conditions and for all methods of modulation shall not exceed the following values:

-120 dB(W/m²) in any 1 MHz band for angles of arrival between 0 and 5 degrees above the horizontal plane;

-120 + (δ -5) dB(W/m²) in any 1 MHz band for angles of arrival δ (in degrees) between 5 and 15 degrees above the horizontal plane;

-110 + 0.5(δ -15) dB(W/m²) in any 1 MHz band for angles of arrival δ (in degrees) between 15 and 25 degrees above the horizontal plane; and

-105 dB(W/m²) in any 1 MHz band for angles of arrival between 25 and 90 degrees above the horizontal plane;

These limits relate to the power flux-density that would be obtained under assumed free-space propagation conditions.

PART 101 – FIXED MICROWAVE SERVICES

6. The authority citation for part 101 continues to read as follows:

AUTHORITY: 47 U.S.C. 154, 303.

7. Section 101.147 is proposed to be amended by adding new note 31 to read as follows:

§ 101.147 Frequency assignments.

- (a) Frequencies in the following bands are available for assignment for fixed microwave services.

* * * * *

38,600–40,000 MHz (4)(31)

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Notes

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(31) Frequencies in this band are shared with stations in the fixed-satellite service, subject to the conditions specified in footnote 14 of Section 25.202(a)(1), *see* 47 C.F.R. § 25.202(a)(1) n.14.